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NOTES ON THE ARGONAUT.

BY W. H. DALL.

THE Argonaut, or Paper-sailor, is familiar to all who live in seaports; its elegant form and delicate texture making it deservedly a favorite ornament for table or mantel; and certainly nothing can be more exquisite than a perfect specimen of one of the larger species. It is of a snowy whiteness, with delicate undulating ridges, and the keel ornamented with a regular series of conical projections or tubercles, which near the spire are lightly touched with black. Perhaps its greatest charm is its perfect symmetry, in which it is only equalled by the pearly Nautilus which, however, it far surpasses in its sculpture, fragility and purity.

The Argonaut shell is formed, curiously enough, by the females only; as among more highly organized beings sometimes, the gentler sex outshine their brothers in the splendor of their apparel, and the extent it occupies. Unlike many, however, the Argonaut toils not, neither does she spin. Folding her arms about her, in her earliest infancy, she is speedily arrayed in all her glory, and has not shown any discontent at the old fashions since the time of Aristotle.

These animals are true cuttle-fish of the eight armed type. The male Argonaut is an insignificant shell-less creature, fond of retirement, solitary and rarely seen. When the tender passion seizes him, as he rocks on some sunny wavelet,* far from female society, he does not go in search of a wife, but with Spartan courage, detaches one of his eight hands (or arms) and consigns it to the deep, in the hope that some tender hearted individual of the other sex will fall in with it and take it under her protection. Thus for a long time the male Argonaut was unknown, the arm (which does not die when detached, but lives an independent worm-like life)

*The Argonauts have been observed floating on the water.

was, when found in the gill-chamber of the female, supposed to be a parasite, and was called *Hecto-cotylus*.

The shelly matter is secreted by the first pair, or dorsal arms, which are broadly expanded towards the ends, and also by the sides of the body, which are more closely connected with the shell than many naturalists have supposed. But there are no true muscular attachments as in other mollusca, of the animal to the shell.

I have seen fine specimens of Argonauta in the cabinet of Mr. Arnold, of Worcester, collected by himself; showing where the shell had been broken and repaired, the new layer in some places having been deposited by the sides of the body from the *inside* of the shell, and in others by the expanded arms from the outside. The anterior edges of these arms, however, seem to possess alone the power of secreting calcareous matter, as the fractures toward the spire were repaired with a deposit more membranous or horny than shelly.

The cuttle was, in more modern times, long supposed to have stolen its shell from some mollusk resembling Carinaria, known as the glassy Nautilus. The shell of Carinaria is very similar, taken by itself, to that of Argonauta straitened out, but it serves a totally different purpose. The Argonaut, separated from its shell, was described by Rafinesque as Todarus, he having described at the same time one of the large naked cuttles, as Ocythoë. According to his own account, his description being short and careless, the two were confounded. He says that the Sicilian fishermen call the Argonaut "*todaru*"; that the apex of the shell is blackened by a dark liquor which it emits, although it has not the ink-bag of the Sepias; and that the color of the eggs is black.

The animal was well known to the ancients as the inhabitant of its own shell, though they described it with poetical fancy, as sailing in pleasant weather on the surface, using its broad arms as sails, and the others as oars, and when the

sky became overcast, storm threatened or high wind arose, as drawing in its sails and seeking safety beneath the waves. It was the original "Nautilus," the pearly Nautilus being unknown to them.

The Argonaut swims rapidly by ejecting water through its siphon,—a large tube quite distinct from the mouth. This tube is placed just above the keel of the shell, and the large broad arms are always closely applied to the shell, though they can be slightly contracted. If the animal is removed from its shell, it cannot get into it again. It probably cannot form a new one for reasons already mentioned. Deprived of its protection, it beats itself about blindly till it dies.

The eggs have been said to be deposited *inside* of the spire. I think that this is a mistake. In the specimens I have seen, they are agglutinated to the outside of the apex, inside of the last whorl, as represented by M. Rang. (See Woodward's Manual, fig. 32.)

I believe the Argonauts are of limited distribution. Some extend over larger areas than others, particularly the Pacific species. But it is probable that when our knowledge of the subject is increased by a greater number of observations, we shall find that these beautiful creatures have their boundaries, outside of which they may rarely or never be found. Many species have been confounded, as the shells all closely resemble one another. *Argonauta argo* has been reported from the Mediterranean, to which it is strictly confined; from the Indian Ocean, Philippines, and even from California! For the last species I have proposed the specific name of *Pacifica*, as a comparison with Mediterranean specimens shows that, aside from the question of distribution, the shells differ. As an example of the probably limited distribution of these mollusca, I note as follows:

In 1849, M. Noury, captain of a French frigate, obtained a new and very distinct and beautiful Argonaut, from the whaling grounds off the coast of Peru, in Lat. 10° south. It

was described by M. Lorois in the "Révue et Mag. de Zoologie," in 1852, as *A. Nouryi*. Mr. Conrad, in his monograph of the genus, mentions that Capt. O. Swain, of Nantucket, in 1850, obtained a number of this species in the same vicinity. They were observed on the surface of the water on a perfectly calm day, when the sun was very hot. They appeared in large numbers, in one group at first, and then dispersed in smaller groups of twos and threes, moving with great rapidity over the surface. Approaching them with great caution, a number were secured. A year or two ago Capt. Dow, well known as an indefatigable collector, sent to the Smithsonian Institution two fine specimens captured in Lat. 10° south, Long. 90° west, almost the same spot whence they were originally obtained by M. Noury. So far as I am able to ascertain they have not been elsewhere detected. In one of them the ova, of a red color and very small, were agglutinated to the outside of the spire, as previously noted.

It is pleasant to add that our first detailed account of the Argonaut and its development, was published by a lady, Madame Power, who made her observations in the Mediterranean, having a sort of marine enclosure made, where she kept these animals and observed their habits from life.

ON THE PARASITIC HABITS OF CRUSTACEA.

BY A. E. VERRILL.

THERE are few subjects pertaining to the study of animals more curious and interesting than the various phenomena connected with the parasitism of certain species upon others. This subject is also one that has many important practical bearings, since our worst crop-destroying insects are kept in check mainly by insect parasites, feeding either on the eggs, the larvæ, or the mature insect. Our domestic animals also.